

Nivaçle (*shichaam lhavos* variety)

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Nivaçle [niβa'kɫe] (ISO 639-3: *cag*) is a Mataguayan language spoken in the Argentinean and Paraguayan Chaco by approximately 16,350 speakers in Paraguay (DGEEC 2012) and 553 in Argentina (INDEC 2004–2005).

The word Nivaçle means ‘human being’ in a broad sense (Chase-Sardi 1990: 7); for the Nivaçle people, it means ‘person’ and ‘man’ (Fritz 1994: 35). The Nivaçle language has also been referred to in the literature as *Gentuse/Wentusi/Wentusix* (Greenberg 1956, Loukotka 1968, as cited in Stell 1989: 20), *Ashlushlay* (Nordenskiöld 1910, Henry 1936, Wicke & Chase-Sardi 1969, Stell 1972), *Chulupí* (Junker, Wilkskamp & Seelwische 1968, Stell 1989) and *Chunupí* or *Suhin* (Hunt 1915, 1924), among other names.¹ While *Chulupí* is commonly used in Argentina, Nivaçle is the term used in Paraguay. Here I adopt the name Nivaçle, rather than Nivaçlé, Nivakle, or Niwakle, following the conventions established during the II Nivaçle Linguistic Conference (Uj’e Lhavos, Paraguay, 3–5 December 2010).

Besides Nivaçle, the Mataguayan (Swadesh 1959, Najlis 1984, Fabre 2005, Nercesian 2014a) language family comprises three other languages: Chorote, Maká, and Wichí. This language family has also received alternative names in the literature, such as *Mataco* (Loukotka 1968: 53–55; Voegelin & Voegelin 1977: 223–224), *Mataco-Mataguayan* (Tovar 1951: 400; 1961), *Mataco-Maka* (Kaufman 1990: 46), and *Matacoan* (Campbell 2012).

The location of the Mataguayan languages and peoples span across Northeastern Argentina, Southeastern Bolivia, and Southwestern Paraguay – a region known as the Gran Chaco (from Quechua *chaku* ‘hunting land’). The Gran Chaco comprises about 1,000,000 square kilometers divided between Northern Argentina, Eastern Bolivia, West of Paraguay and South-East of Brazil. Approximately twenty-nine languages belonging to seven language families with different degrees of vitality (Arawakan, Guaycuruan, Lule-Vilela, Mataguayan, Tupí-Guaraní, Maskoyan (or Enlhet-Enelhet) and Zamucoan) and two language isolates, Chiquitano (or Besiro) and Guató, are spoken in this region (Golluscio & Vidal 2009–2010).

Priest Seelwische’s Nivaçle grammar (Seelwische 1975), and his Nivaçle-Spanish dictionary (Seelwische 1990) are the standard references on the language available to the

¹ This name has caused some confusion in the literature because *Chunupí* is an alternative name of Vilela (Lule-Vilela), a genetically unrelated Chaco language.

Nivaçle communities. The current phonemic orthographic system, which has been revised by the Linguistic Committee of the Nivaçle People (*Comisión Lingüística del Pueblo Nivaçle*, CLPN), is based on his works. In the Paraguayan Chaco, Nivaçle writing and reading skills are taught until the sixth grade of primary school.

According to Chase-Sardi (1981) and Stell (1989), there exist five dialects: (i) *chishamnee lhavos* ‘the highlanders/Upriver’, (ii) *shichaam lhavos* ‘the lowlanders/Downriver’ (both of these groups are known as *to voc lhavos* ‘people of the (Pilcomayo) river’), (iii) *yita’ lhavos* ‘people of the scrubland’, (iv) *jotoy lhavos* ‘people of the sandy spot’, and (v) *tavashay lhavos* ‘people from the inland’. Stell (1989) and Campbell & Grondona (2007) worked with the *chishamnee lhavos* variety. Also, Stell (1989) worked with some *shichaam lhavos* speakers. I have worked with *shichaam lhavos* and *yita’ lhavos* speakers. During my fieldwork, I mostly found lexical differences between the *chishamnee lhavos* and the *shichaam lhavos* varieties, and some phonological dialectal differences between the *yita’ lhavos* and the other varieties. For instance, in the *yita’ lhavos* variety, there is no low back unrounded vowel /a/, and the sequence /kɪʔ/ is pronounced as [kʰ], rather than [kɪʔ], in comparison with the *shichaam lhavos* variety.² Further, I have documented a number of lexical and morphosyntactic differences that have been arising between younger and older generations, currently under study.

The data for this illustration come from two *shichaam lhavos* speakers: a 72-year-old male speaker, Félix Ramírez (FR), and a female 50-year-old speaker, Teresita Sánchez (TS). Both FR and TS were raised in the *shichaam lhavos* variety and now live in Uj’e Lhavos, a Nivaçle community located 1 km from Filadelfia, Boquerón Department, Paraguay. Nivaçle is their native first language and they continue to speak it in their community. They are also bilingual in Spanish; FR learned it when he started Catholic Boarding School at Misión San Leonardo, Fischat, at the age of 7. TS also learned Spanish during primary school. Both FR and TS are Nivaçle teachers and members of the Nivaçle Linguistic Team (ELN). Recordings for this illustration were made in a quiet room using a Zoom HN4 handy portable digital recorder and a Countryman lapel microphone (phantom power).

Consonants

		Labial	Dental-alveolar	Palato-alveolar	Palatal	Velar	Uvular	Glottal
Stop	Plain	p	t			k	[q]	
	Ejective	pʰ	tʰ			kʰ	[qʰ]	ʔ
	Laterally released					kɭ	[qɭ]	
Affricate	Plain		ts	tʃ				
	Ejective		tsʰ	tʃʰ				
Fricative		f	s	ʃ	ç			
Nasal		m	n					
Approximant		w ~ [β] ~ [v]			j	w		

Instances of phonemic contrasts for onset and, in some cases, coda position, are given through the following illustrative minimal and near-minimal pairs:

² An anonymous reviewer states: ‘in the speech of the younger generations of the *chishamnee lhavos* variety (at least in some communities) the same is true’. It is worthy of mention that Stell (1989: 534) noted that [a] was also absent from the speech of adult *chishamnee lhavos* speakers (in comparison with *shichaam lhavos* speakers).

	PHONEMIC	ORTHOGRAPHIC	GLOSS	
	/p/	am ¹ pa	<i>ampa</i>	‘nothing’
	/ʔ/	am ¹ ʔa	<i>am¹ô</i>	‘rat’
	/p/	na ¹ puʔ	<i>napu¹</i>	‘two’
	/p ^ʔ /	na ¹ p ^ʔ u	<i>nap^ʔu</i>	‘s/he licks’
	/t/	‘ti	<i>ti</i>	‘that’
	/t ^ʔ /	‘t ^ʔ i	<i>t^ʔi</i>	‘broth’
	/k/	tkam ¹ kaj	<i>tcamcôï</i>	‘s/he makes flour’
		‘kus	<i>cus</i>	‘heat’
	/k ^ʔ /	‘k ^ʔ us	<i>c^ʔus</i>	‘happy’
	/ts/	a ¹ tsetʃ	<i>atsech</i>	‘splinter’
	/ts ^ʔ /	‘ts ^ʔ am	<i>ts^ʔam</i>	‘slow’
	/tʃ/	niβak ¹ tʃe	<i>nivacche</i>	‘woman’
	/tʃ ^ʔ /	tʃe ^ʔ tʃe	<i>ch^ʔech^ʔe</i>	‘parrot’
	/k̠/	tkam ¹ k̠aj	<i>tcamc̠lôï</i>	‘s/he makes (somebody) suffer’
		xa ¹ k̠an	<i>jaçlôn</i>	‘I kill’
	/ʎ/	xa ¹ ʎan	<i>jalhôn</i>	‘I light’
		xa ¹ t̠i	<i>jatiilh</i>	‘I thread’
	/f/	xa ¹ t̠if	<i>jatiif</i>	‘I suckle’
	/s/	ka ¹ t̠is	<i>catiis</i>	‘star’
	/ʃ/	xa ¹ t̠iʃ	<i>jatiish</i>	‘I dig’
	/f/	-k ^ʔ uts ¹ fa	<i>-c^ʔutsfa</i>	‘friend’
	/x/	k ^ʔ uts ¹ xaʔ	<i>k^ʔutsja¹</i>	‘elderly woman’
	/m/	‘muʔ	<i>mu¹</i>	‘wow!’
	/n/	-‘nuʔ	<i>nu¹</i>	‘bone’
	/j/	ja ¹ kut	<i>yacut</i>	‘black’
	/w/	wa ¹ kuʔ	<i>vacu¹</i>	‘s/he swings’

Nivaçle has 21 phonemic consonants. These consonants contrast in five places and five manners. Similarly to other Mataguayan languages, Nivaçle has a two-way laryngeal distinction in non-continuant obstruents (plain vs. ejectives) – except for the complex segment [k̠] – and no voicing contrast (voice vs. voiceless) within the obstruent class. Ejective [p^ʔ] is not as frequently found as [t^ʔ] and [k^ʔ]; LABIAL is the most marked place of articulation in this language; for example, there are no LABIAL–LABIAL consonant clusters. The series of stops tend to be aspirated word-finally.

Fricatives contrast in four places, and there is a lateral fricative. A remarkable contrast with Chorote, Maká and Wichí is that Nivaçle has a palato-alveolar fricative [ʃ] and a palato-alveolar affricate [tʃ].³ Besides the existence of roots with [ʃ] and [tʃ], there exists an alternation between Nivaçle palatal and velar-initial suffixes: [tʃ] ~ [k], [ʃ] ~ [x]. The palatal vs. velar realization of the consonant-initial suffix is motivated by the vowel quality of the rightmost vowel of the preceding root.⁴ If there is a front vowel, the palatal variant is used. In that regard,

³ The Bermejo variety of Wichí (Nercesian 2014b) also has the affricate [tʃ] in the phonological inventory, but only in onset position.

⁴ Interestingly, the trigger (vowel) and the target (consonant) are not necessarily adjacent; there can be labials, coronals, dorsals, and a glottal stop before the affricate and fricative palato-alveolars.

it can be observed that whereas [a] patterns with front vowels, [ɑ] patterns with back vowels (see ‘Vowels’ section below). It can be also noted that a small number of stems with [tʃ] and [k] spirantize to [x] in the context of pluralization. However, this is a marginal phenomenon that is not present in other areas of the grammar.

The sound /w/ has both labial and dorsal properties and hence is listed under both place of articulation columns. In the *shichaam lhavos* variety, [β] and [v] appear to have replaced the use of /w/. However, the latter can still be found preceding back vowels /ɑ o u/. Further, in the variety described here, the alternation between velar and uvular places of articulation is mostly based on the vowel quality present in the immediate environment of the consonant: front /i e a/ vs. back /ɑ o u/ vowels, respectively. Nevertheless, uvular articulations can sometimes be found before front vowels as well.

Laterals

One of the marked characteristics of the Nivaêle phonological inventory is the absence of a sonorant lateral /l/; a language with one or more laterals typically has one voiced lateral approximant. According to Maddieson (2013), only 1.4% of the 567 surveyed languages have no /l/, but nonetheless have lateral obstruents. Nivaêle shares this marked phonological feature with genetically unrelated (and areally remote) languages like Athna (Athabaskan), Kutenai/Ktunaxa (isolate), Nuu-chah-nulth (Wakashan), Tlingit (Na-Dene), Kiowa (Kiowa Tanoan), Chukchi (Chukotko-Kamchatkan), Kabardian (Northwest Caucasian), and Tigak (Austronesian).

The Nivaêle lateral system is comprised of the alveolar lateral fricative /ʎ/ and the complex segment /kʎ/. These two sounds are interesting from both typological and theoretical perspectives in that:

- (i) To the best of my knowledge, /kʎ/ is neither attested in any of the genetically related languages, nor in other indigenous languages of the area.
- (ii) On the one hand, /kʎ/ has been described as a non-homorganic affricate that involves a ‘simultaneous articulation and release of a velar stop and a dento-alveolar lateral’ (Stell 1989: 58; my translation from Spanish – AG). Interestingly, the articulators do not agree in voice and the lateral release is not fricated. On the other hand, /ʎ/ has been described by Stell (1989: 58) as ‘a voiceless dento-velar fricative’.
- (iii) As originally pointed out by Maddieson (1984: 77) ‘velar laterals are extremely rare . . . the three complex laterals segments reported to have both velar and dental/alveolar articulations are all somewhat obscurely described. All three are voiceless and fricative or affricate, being interpreted as /xʎ/ /kʎ/ (Ashuslay [Nivaêle], 814) and /kʎ/ (Zulu, 126)’.
- (iv) A language with two or more liquids is expected to have a contrast of a lateral and a non-lateral. Nevertheless, in Nivaêle, both liquids are laterals and there are no non-lateral liquids (that is, there are no ‘r’ sounds).⁵
- (v) A language with two or more laterals contrasts them either in place or in manner and voicing, but not both (Maddieson 1984: 88). However, the two Nivaêle laterals – /ʎ/ and /kʎ/ – contrast both in place (CORONAL vs. DORSAL, respectively) and manner of articulation [continuant] (Gutiérrez 2015).

As can be seen in (1), comparative data show that Nivaêle [kʎ] corresponds to /l/ in other Mataguayan languages, and that it must have developed from Proto-Mataguayan *l.

⁵ I am grateful to an anonymous reviewer for reminding me about this marked characteristic of the Nivaêle lateral system.

(1)	PROTO-MATAGUAYAN	CHOROTE	WICHÍ	MAKÁ	NIVAÇLE	GLOSS
a.		[-le]	[-lixuʔ]	[-lex]	[-kɫej]	‘wash’
b.		[tateteʔ]		[tʰil]	[-tʰik]	‘tear’
	*l	[tatetel]			[-tʰikɫej]	‘tears’
c.		[alaʔ]	[xala]		[-kɫaʔ]	‘stick’
d.		[-lan]	[-lon]	[-lan]	[-kɫan]	‘kill’
e.			[lup]		[kɫop]	‘winter’
f.		[talok]			[tʰakɫuk]	‘blind’

Gutiérrez (2014) argues that /kɫ/ is the diachronic result of lateral hardening, where ‘hardening’ is defined in terms of the amount of contact between active and passive articulators, and duration of the contact (Keating 2006).⁶ Regarding the phonetic explanations behind the historical development of /kɫ/, Gutiérrez (2015) hypothesizes that the lateral approximant was realized with a brief stop closure which was misinterpreted as a real stop burst and reanalyzed as a laterally released stop. Further, the development of *l into [kɫ] and not into [tl] can be explained by the ambiguous nature of laterals in consonant clusters; it has been shown that the lateral release has a substantial effect on the acoustics of coronal stops, shifting them acoustically closer to velars (Kawasaki 1982, Hallé, Best & Bachrach 2003, Flemming 2007).

Prosodic structure

The Nivaçle prosodic system consists of the following structures: C, CV, CVC, and CCV(C). The only consonant that can be syllabic is the lateral fricative [ɫ]. Contra Stell (1989), I claim that there are no onsetless syllables in the language. ONSET is undominated; an epenthetic glottal stop is inserted word-initially or intervocally to comply with this constraint. All Nivaçle consonants may appear in singleton onsets. At most, there can be two heterosyllabic consonants in word-internal position. Complex onsets are allowed in the language but only word-initially. Ejectives /pʰ tʰ kʰ tsʰ tʃʰ/ cannot occur as the first member of a complex onset, but can occur as the second member, e.g. [tʃʰakfaj] ‘s/he is married (with children)’.⁷

While closed syllables are very common, complex codas are not allowed in this language. It has been extensively observed that certain marked structures are banned in coda (Itô 1986, 1989) position. In Nivaçle, all consonants may appear in coda position except for the ejectives /pʰ tʰ kʰ tsʰ tʃʰ/ and the complex segment /kɫ/. The affricates /ts/ and /tʃ/ marginally occur in coda position.⁸ The affricate /ts/ simplifies to [s] and to [t] in coda position, except before [x].

The contrast between plain and ejective non-continuant obstruents only occurs in onset position. Steriade (1997) claims that the timing of the laryngeal constriction in ejective obstruents is tied to their release. Thus, ‘an optimal identification of an ejective ... will depend on the nature of the right hand context’ (Steriade 1997: 78); ejectives neutralize in the absence of a following sonorant. In (2a), it can be observed that Nivaçle ejectives lose their [constricted glottis] feature when not followed by a vowel, see (2b).

⁶ If we consider the different articulation of [l] and [kɫ], in the articulation of [kɫ] there is more contact between the passive articulator (the area behind the incisors, the molars and the velum) and the active articulator (blade and back of the tongue) than that found in [l], where only the tip of the tongue touches the area behind the incisors. Further, the duration of [kɫ] is significantly longer than the duration of [l] (Gutiérrez 2015), a feature that is typical of hardened or strengthened units.

⁷ Note that this item is missing from the archive.

⁸ An anonymous reviewer points out that in another variety of Nivaçle [tʃ] weakens to [tʰ] in word-final position. I have not found this phenomenon in the *shichaam Ihavos* or *yita’ Ihavos* varieties. In addition, this reviewer mentions that consonants lengthen before a stressed vowel. I have not noticed any significant durational difference in the varieties under study.

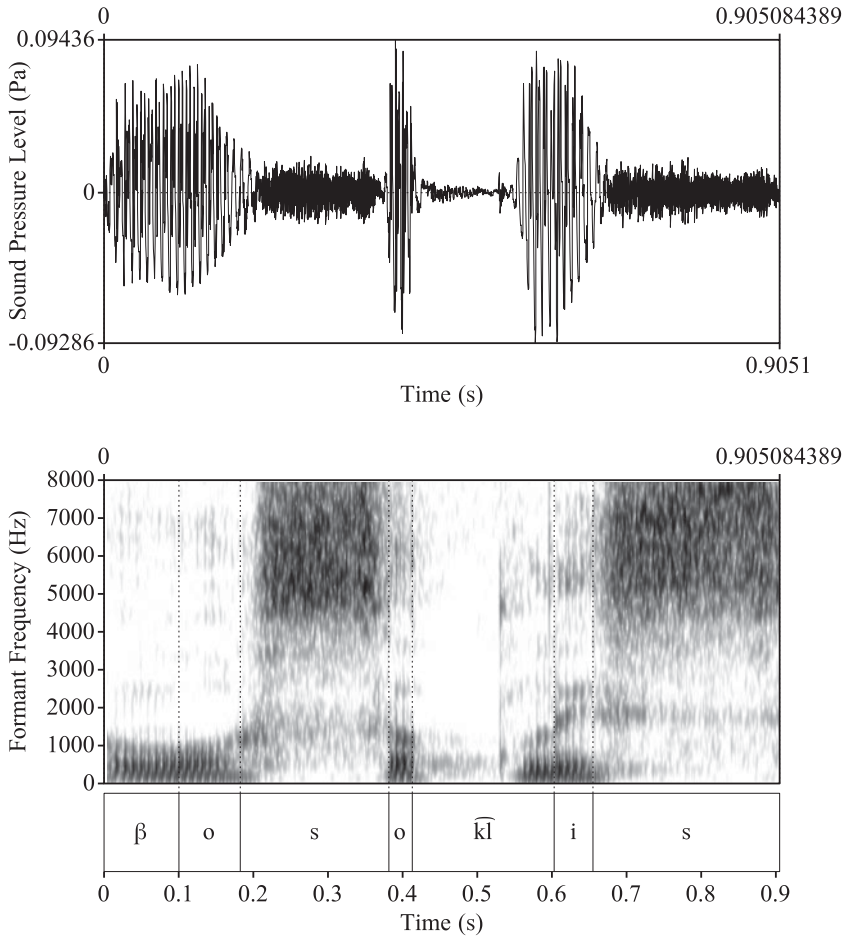


Figure 1 Waveform and spectrogram of [βoso'kɪis] 'butterflies' by male speaker FR.

- (2) a. -qa'ts'ex
'diarrhea'
- b. -qɑtsxe-¹nax
 diarrhea-RES⁹
 'person that has diarrhea'

In turn, the complex segment /kɪ/ in (3a) also neutralizes (delateralizes) to [k] in coda position, see (3b).

- (3) a. βoso'kɪ-is
 butterfly-PL
 'butterflies'
- b. βo'sok
 'butterfly'

Figures 1 and 2 show the alternation found in (3a) and (3b), that is, between [kɪ] and [k], respectively. In Figure 2, no trace of the lateral realization is present; the complex segment

⁹ Abbreviations used in this paper include: 1 = first person, 3 = third person, CLASS = classifier, COL = collective, PL = plural, POSS = possessive, RES = resultative, S = subject.

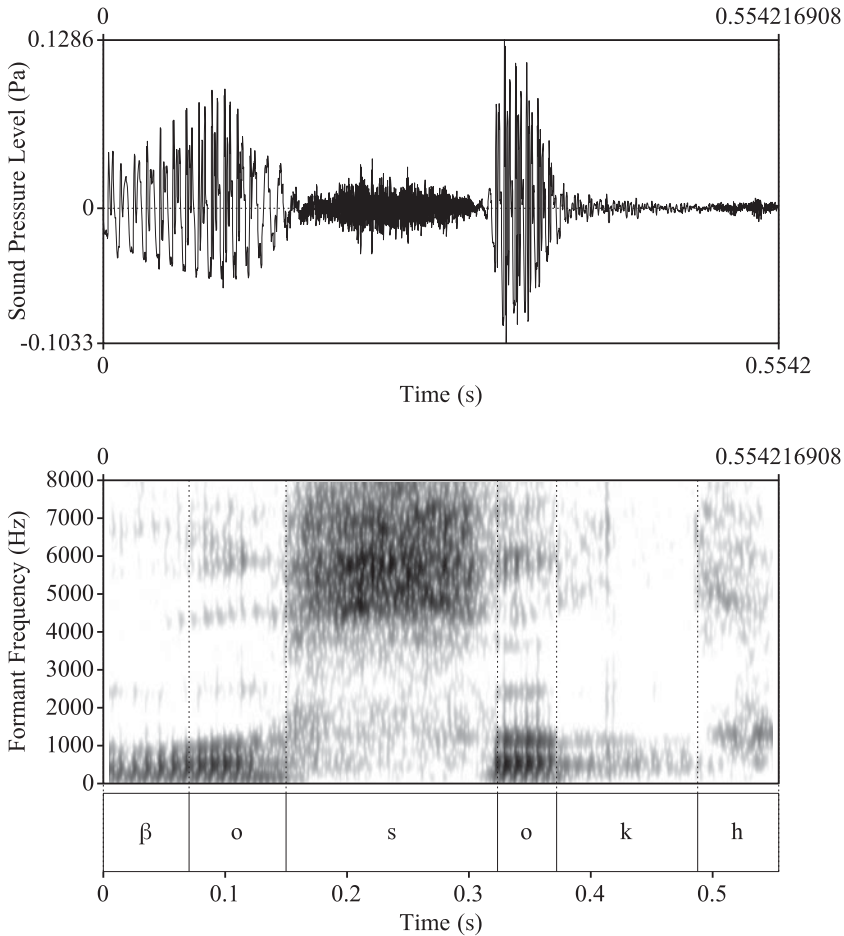
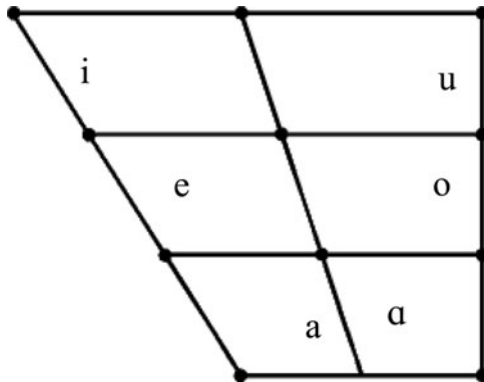


Figure 2 Waveform and spectrogram of [βo'sokʰ] 'butterfly' by male speaker FR.

delateralizes to [k] and not to [l] in coda position. The fact that [kɫ] neutralizes to [k], and not to [l], indicates that:

- (i) the synchronic underlying representation is /kɫ/; the dorsal component is a major articulator phase. In other words, it is not the case that /kɫ/ is a prestopped lateral, but rather, it is a laterally released velar stop (Gutiérrez 2015).
- (ii) /kɫ/ is not a consonant cluster. During fieldwork and workshops on the Nivaçle language, my consultants indicated the importance of differentiating Nivaçle [kɫ] from Spanish consonant clusters [kl] or [gl]. Further, they also claimed that the two components cannot be separated by any (exrescent) vowel, as it may be the case of Spanish obstruent + liquid consonant clusters (Colantoni & Steele 2005). There is no independent lateral approximant segment in Nivaçle and speakers do not identify [l] as a native sound in their language (though they acknowledge that there are few words with [l]); this sound is present in few loanwords such as [ele] 'missionary', and [palaβaj] 'Paraguay'.

Vowels



There are six vowels in Nivaçle: /i e a o u/. In Figure 3 the vowel plots for a male (FR) and a female speaker (TS) are presented. Each of the six Nivaçle contrastive vowels /i e a o u/ were recorded in the context of a preceding alveolar stop in a stressed syllable.

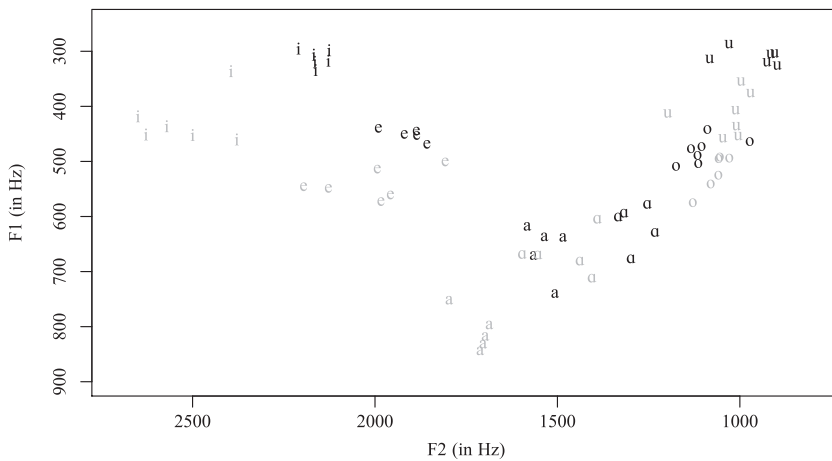


Figure 3 Nivaçle vowels charted in a two-dimensional F1 F2 space, male speaker (FR) in black, female speaker (TS) in grey.

Each speaker was recorded pronouncing at least five tokens of the words listed in (4) below. For some vowels, six tokens were recorded (e.g. for vowel [i], see Figure 3). Words were recorded in isolation, that is, no carrier phrase was used.

- | | | | | |
|-----|--------|----------------------|-------|---------|
| (4) | 'ti | 'that' | i'taχ | 'fire' |
| | ji'teχ | 'algarroba de vinal' | 'tos | 'snake' |
| | 'tata | 'dad' | 'tuł | 'night' |

Vowels were segmented using Praat (Boersma & Weenink 2014) for Mac. The midpoint of each vowel was estimated in Praat using Linear Predicting Coding (LPC) analysis with a series of overlapping Gaussian 50 ms windows and a 25 ms step size. Formant values are given in Hertz.

Table 1 below presents the mean and standard deviation values for the first and second formant of each vowel. Because vowels were not normalized, the values are presented separately for each speaker.

Table 1 F1 and F2 mean and standard deviation (SD) values for each Nivaçle vowel.

Speaker	Vowel	F1 (Mean)	SD	F2 (Mean)	SD
FR	i	311	15	2160	31
	e	451	11	1908	51
	a	615	48	1535	40
	ɑ	660	39	1287	43
	o	480	18	1100	62
	u	309	14	959	77
TS	i	425	46	2520	115
	e	540	22	2011	136
	a	806	36	1719	44
	ɑ	667	39	1477	92
	o	520	33	1068	34
	u	414	38	1034	75

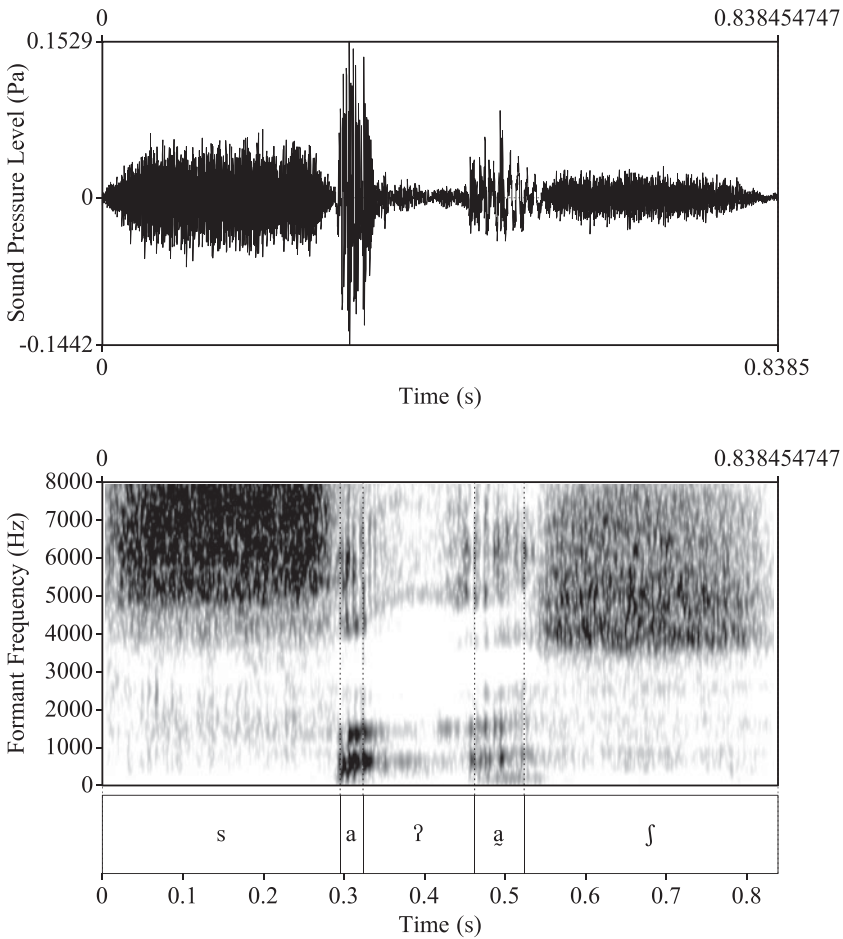


Figure 4 Waveform and spectrogram of [-¹saʔᵃ] 'hair' by male speaker FR.

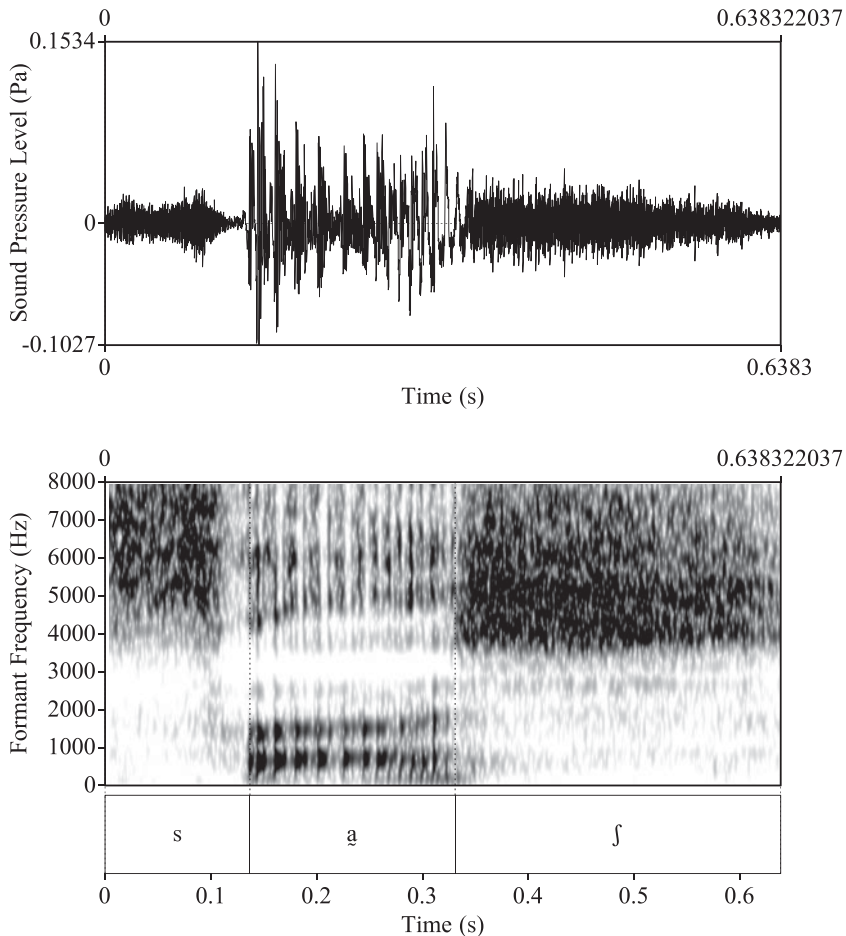


Figure 5 Waveform and spectrogram of [-'saj] 'hair' by male speaker FR.

Glottalized vowels

Stell (1989: 97) postulates a phonemic distinction between plain vowels /i e a o u/ and 'glottalized' vowels /i è á a ò ù/, yet vowel laryngealization or creakiness is not reported for other Mataguayan languages as being contrastive. In this sense, and if accurate, Nivaçle exhibits an innovation in the language family. I discuss this possibility below.

In Gutiérrez (2010, 2012, 2013), I argue that Nivaçle glottalized vowels are underlying vowel–glottal stop /Vʔ/ sequences, where the glottal stop is specified for the feature [constricted glottis]. On the basis of my fieldwork, I confirm that this postulated /Vʔ/ sequence has two realizations, depending on prosodic context: (i) REARTICULATED VOWELS, represented variably as [Vʔʷ] ~ [V] (Figures 4 and 5, respectively) and (ii) VOWEL–GLOTTAL CODA, represented as [Vʔ] (Figure 6).

It has been noted in the literature that the implementation of glottalized vowels is subject of variation within and between speakers across languages (Avelino 2004, Gerfen & Baker 2005). The Nivaçle rearticulated vowels follow this trend; they tend to consist of:

- (i) a modal vowel portion followed by a full or short glottal closure released into a short voiceless or creaky vowel [Vʔʷ] ~ [Vʔʷ] (see Figure 4), or
- (ii) a period of laryngealization/creak [V] (see Figure 5).

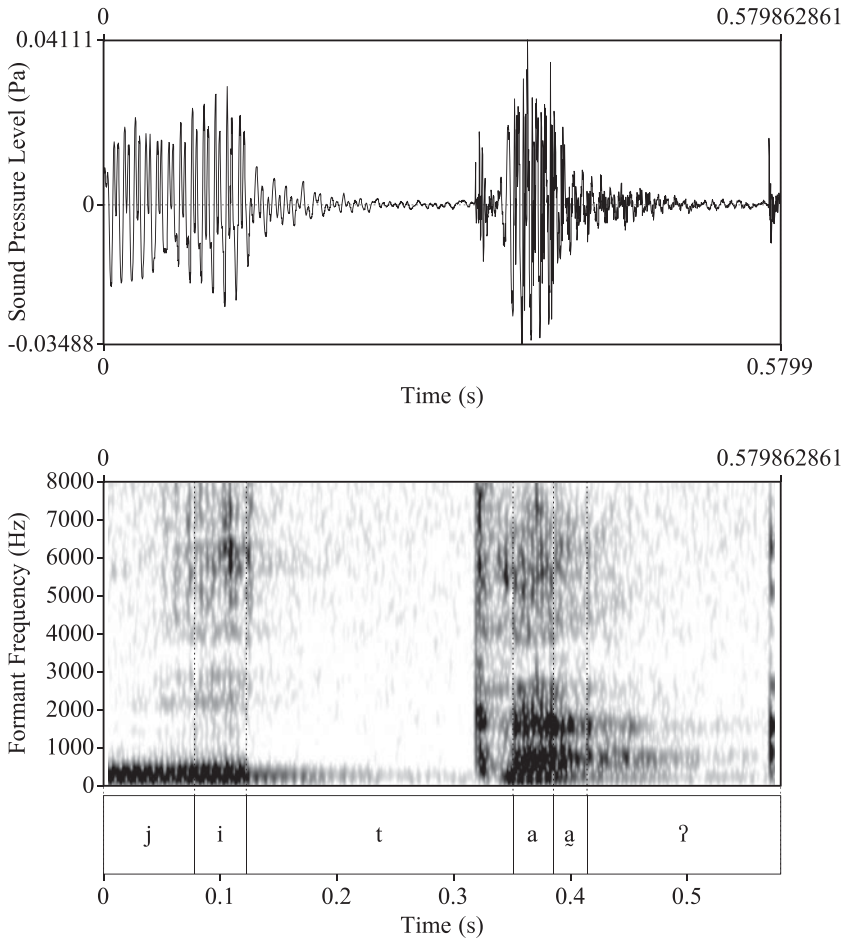


Figure 6 Waveform and spectrogram of [ji'taʔ] 'scrubland' by male speaker FR.

In the case of rearticulated vowels, stress is consistently realized on the first, not the second (or rearticulated) portion of these sequences. Given this observation, I hypothesize that the rearticulated portion does not constitute a second, separate syllable. Rather, these rearticulated vowels constitute a single complex syllabic nucleus. The description of rearticulated vowels is similar to what are sometimes referred to as echo vowels, which have the same vowel quality as the vowel preceding the glottal stop, but their formants are weaker (Gerfen & Baker 2005), that is, lower in amplitude.

The alternation between rearticulated and creaky vowels seems to be mostly due to speech style factors. Whereas the rearticulated variant [Vʔʷ] is typically used in careful speech, the creaky variant – [V] – is heard in fast or casual speech. It is worthy of mention that the loss of a glottal closure in rearticulated /Vʔʷ/ sequences is a common cross-linguistic process.

In turn, Figure 6 illustrates the Nivaêle vowel–glottal coda, represented by [Vʔ] when there is no (other) coda consonant in the syllable. It consists of a modal vowel portion followed by a glottal closure. The last part of the vowel can be creaky due to the adjacency with the glottal stop.

Non-modal phonation types have been commonly associated with longer duration relative to modal phonation types (Gordon & Ladefoged 2001: 18; Blankenship 2002: 185,

189). Interestingly, Gerfen (1999: 49) posits a correlation between vowel glottalization in Coatzospan Mixtec and stress, more specifically, that it is licensed by stress.

Given the above generalizations, there are several important observations about the distribution and characteristics of Nivaçle glottalized vowels. First, duration is a statistically significant acoustic property that differentiates modal from rearticulated vowels in Nivaçle; rearticulated vowels are (almost) twice as long as their modal counterparts. Five repetitions of each word listed in (5)–(10) were recorded in isolation; duration measurements were done in Praat.

- (5) 'k'-jɨs 'ʔɨs
1.S-write 'nice'
'I write'
- (6) -'kɫɛʃ ʔ-'kɫɛs
'wash' 3.POSS-children
'his/her children'
- (7) -'sɑʃ -'sɑʃ
'hair' 'mucus'
- (8) -'kɫɑp -'kɫɑp
'to sit on a lap' 'fast'
- (9) 'kɫɑp 'kɫɑp
'winter' 'white'
- (10) ji-f'xɯx ji-f'xɯx
1.POSS-stick 1.POSS-toe
'my stick' 'my toe'

Figure 7 presents the duration results for the rearticulated and modal vowel pairs.

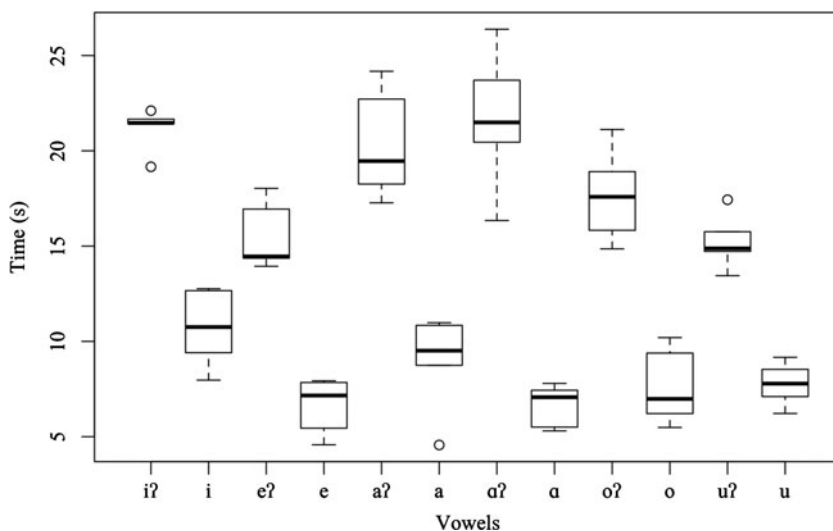


Figure 7 Duration results for rearticulated vs. modal vowel pairs: male speaker FR.

It can be observed that the durational difference between the six modal [i e a o u] and rearticulated [j̥ e̥ ḁ o̥ u̥] vowels in the context of near-minimal pairs and minimal pairs shows significant values for the male speaker FR. A one-sided *t*-test confirmed that the glottalized vowels (M = 186, SD = 34) were longer than the modal vowels (M = 80, SD = 21; $t(56.33) = 15.4$, $p < .001$). Further, and concomitantly, glottalized vowels are always stressed.¹⁰ I thus propose that Nivaçle glottalized vowels are underlyingly bimoraic and are licensed by the head of an iambic foot (Gutiérrez 2015).

Stress

Stress in Nivaçle can be associated with the following phonological and phonetic properties. First, all lexical words have lexical prominence or primary stress ('obligatoriness parameter') with one syllable bearing the highest degree of prominence – 'culminativity parameter' (Hyman 2006). Second, stressed vowels are longer than unstressed vowels. As previously mentioned, glottalized vowels always occur under stress and are double the duration of modal vowels, hence my analysis of them as bimoraic.

In terms of metrical structure, I propose that (i) the Nivaçle foot type is iambic, and (ii) the Nivaçle language has a quantity-sensitive stress system, where the moraic weight of the feature [constricted glottis] is consistently correlated with stress prominence.

Stress assignment in the nominal domain varies across the alienable vs. inalienable paradigm. In alienable nouns, primary stress is final. Iambs are formed from the right edge of the Morphological Root, as in (11a) or the Morphological Stem, as in (11b) unless there is a preceding heavy syllable, as in (12).

- (11) a. si'se
 'cane'
 b. sɪsɪ-ʔʔat
 cane-COL
 'cane field'
- (12) xi'βeʔkɪə
 'moon'

In inalienable nouns, the presence of an obligatory possessive prefix impacts the domain of stress assignment, as shown in (13). Prefixes define the leftmost edge of the Prosodic Word; foot formation proceeds from this edge.

- (13) a. ji-ʔsɔf
 1.POSS-hair
 'my hair'
 b. ji-ʔka-sɔf
 1.POSS-POSS.CLASS-hair
 'my wool'

Note that the vowel /e/ in (11a) above gets reduced in (11b) because it is unstressed; this is a tendency Nivaçle unstressed vowels undergo. Note also that the underlying glottalized vowel of the root /sɔf/ (13b) above gets deglottalized (and thus gets shortened) because it is no longer in a prominent position.

Transcription of a recorded passage

Below I present a relatively narrow phonetic transcription of a spontaneous description of a traditional Nivaçle game (*juc'aj*), spoken and translated by Félix Ramírez Flores. As

¹⁰ Note, however, that the modal vowels measured for comparison were all stressed, in directly comparable closed syllables, as well.

previously mentioned, unstressed vowels tend to reduce (or get deleted); this is indicated in the transcription. The symbol || indicates a pause or the end of an utterance, and | indicates shorter pauses or the end of a phrase.

Semi-narrow phonetic transcription

xu'k'ax || 'uɔj ʔka xu'k'ax ti'tɛm | ʧi 'juʔ 'juʔ pa'pi ji'tsaxj ʧi ,pakxe'kɫaj pa'pi
 'niʔʧəkʃən 'kɫes | 'ɦtsxə ʔkɫes 'juʔ 'ʃita | təx ti 'βeʔtə paʔa'voʔeʃ pə ʧitiʃ'ʃam
 nakots'xət tax napa'toxə'k'ojə | napa'toxə'k'ojə'tan pə || meʔ ti ʧi,βakʔ'teʃ
 pa ʧi'βamxa'ʧənə 'xu:m | paʔa'maʔk'eʃ pakots'xət meʔ ti ʔa'maʔk'eʃ xəm
 pakots'xət pə | ʧijak,ʃaβat'xuʔ pani'jak | ʧa'maʃi 'ʔasə pa'ʔeʧəʃ patʃi'fɪʃ
 tɪ'ma ʧi'fɪʃ | ʧi'n'kətʃəm pə tɪ kots'xət pə ʧi: | ʧi'nej ʔe'k'oʔ | meʔ ti
 ji,βaqtə'teʃ tax ti jəkɫa,mamən'teʃ a'pe: | jəkɫa,mamən'teʃ a'pe: pi,βakʔ'teʃ
 pi'teʃ nɑ'keʃaβə'ʔeʃʃa'nə | pa'βoʃʃa'ne 'βoʃʃa'ne 'βoʃʃa'ne | 'kaχ ti 'pitəxeʃ
 kax tɪ ni,pito'xeʃ 'ʔan || meʔ ti ʧi'βan ji'βan xa'βeʔtə ji'ʧeneʃ ,xəʔnaβa'nik
 ji'kɫaj ʔkɫes na,βaniʔ'kɫes ni,pitsə'xa 'nakə pəʔaβ'xaj

Community orthography

juc'aj. vooi lhca juc'ax ti tem, chi yu' yu' papi yitsjōi chi papi ôcjeçlōi papi
 nich'acshane lhçles, lhutsja lhçles yu' shita, taj ti ve'lha pa lhavo'esh pa chitishshaam
 na cotsjaat taj niapatoja c'oya ni apatoja c'oya lhôn pa. meelh ti chivaçhitesh pa
 chivômjatshane jum, pa lhamôqu'esh pa cotsjaat pa chiyafavatjulh pa niyôç chamashi
 lhôse pa lhechesh pa chifiich tima chifiich, chincaatsham pa ti cotsjaat pa chi, pa chinei
 lhac'o', meelh ti yivaçhitesh taj ti yiçlamaminatesh apee, pa yivaçhitesh pitesh nôque
 avolheishane pa vooishane vooishane vooishane, caaj ti pitejesh caaj ti nipitojesh
 tón. meelh ti chivan yivan ja ve'lha yichenesh ja lhnavanic yiçlōi lhçles navani lhçles
 nipitesajô nôque palhavjōi.

Free translation

This game is called *juc'aj*. Women and men play the game, and female and male teenagers too. Someone prepares the soil; they dig the ground – but not very deep – and hide a ring (made of *caraguata* thread). This person then tamps down the soil, until a dusty area is formed. The players have a stick with a hook at the end and they need to hook the ring. The person that directs the game says, 'Look for it, look for it'. Players try to find the ring with their sticks; they look for it all around until someone finds it and wins the game.

Acknowledgements

My special gratitude to my consultants Félix Ramírez Flores and Teresita Sánchez for teaching me their language with patience and generosity. Many thanks to Molly Babel and Patricia A. Shaw for valuable feedback and comments on drafts of this work. I also thank an anonymous reviewer and Adrian Simpson for their useful comments. Any remaining errors are my own. This research was supported by a Small Grant (2012) from the Endangered Languages Documentation Programme, School of Oriental and African Studies, University of London. It was conducted and submitted for publication in *JIPA* while I was a Ph.D. student at the University of British Columbia.

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